Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Previously presented) A carrier head for chemical mechanical polishing of a substrate, comprising:

a base; and

a flexible membrane extending beneath the base, the flexible membrane including a central portion with an outer surface providing a substrate receiving surface, a perimeter portion connecting the central portion to the base, and at least one flap extending from an inner surface of the central portion, the flap dividing a volume between the flexible membrane and the base into a plurality of chambers, the flap including a laterally extending first section and an angled second section extending beneath the first section and connecting the laterally extending first section to the central portion,

wherein an upper surface of the laterally extending first section and a lower surface of the angled second section bound a same chamber of the plurality of chambers.

2. (Original) The carrier head of claim 1, wherein the first section extends substantially horizontally.

3. (Original) The carrier head of claim 1, wherein the second section has a horizontal loading area sized so as to react out a portion of the downward force on the first section that is created by a pressure in a chamber between the flexible membrane and the base but is not reacted out by the base.

4. (Original) The carrier head of claim 1, wherein second section has a horizontal loading area about one-half that of the first section.

5. (Original) The carrier head of claim 1, wherein a point of attachment of the second section of the flap to the central portion is substantially vertically aligned with a midpoint of the first section between a point of attachment of the first section to the base and a point of attachment of the first section to the second section.

6. (Original) The carrier head of claim 1, wherein the perimeter portion is directly connected to the base.

7. (Original) The carrier head of claim 1, further comprising a retaining ring to surround a substrate on the substrate receiving surface.

8. (Original) The carrier head of claim 7, wherein the first section is sufficiently vertically movable so that a pressure profile applied to a substrate is substantially insensitive to retaining ring wear.

9. (Original) The carrier head of claim 1, wherein the flexible membrane includes a plurality of flaps, each flap including a laterally extending first section and an angled second section extending beneath the first section.

10. (Original) The carrier head of claim 9, wherein the flaps are arranged annularly and concentrically.

11. (Original) The carrier head of claim 10, wherein the flaps are configured to provide three independently pressurizable chambers.

12. (Original) The carrier head of claim 1, wherein the first section and the second section have about the same thickness.

13. (Original) The carrier head of claim 1, wherein the first section and the second section have about the same rigidity.

14. (Original) The carrier head of claim 1, wherein the second section is more rigid than the second section.

15. (Original) The carrier head of claim 14, wherein the second section is thicker than the first section.

16. (Original) The carrier head of claim 1, wherein the flap includes a vertical third section between the laterally extending first section and the angled second section.

17. (Original) The carrier head of claim 16, wherein the flap includes a vertical fourth section between the angled second section and the central portion.

18. (Original) The carrier head of claim 1, wherein the flap includes a vertical section between the angled second section and the central portion.

19. (Original) The carrier head of claim 1, wherein an angle I between the laterally extending first section and the angled second section is between 20° and 80°.

20. (Original) The carrier head of claim 21, wherein an angle I is about 45°.

21. (Original) The carrier head of claim 1, wherein the plurality of chambers provide independently adjustable pressures to an associated plurality of regions of the substrate receiving surface, and the flexible membrane is configured to provide a substantially uniform transition between different pressures in adjacent regions.

22. (Previously presented) A carrier head for chemical mechanical polishing of a substrate, comprising:

a base; and

a flexible membrane extending beneath the base to provide a substrate receiving surface and define a plurality of chambers to provide independently adjustable pressures to an associated plurality of regions of the substrate receiving surface, the flexible membrane configured to undergo vertical deflection to react out force components caused by pressure differential between chambers to provide a substantially uniform transition between different pressures in adjacent regions.

23. (Original) The carrier head of claim 22, wherein the flexible membrane configured to provide a substantially monotonic transition between different pressures in adjacent regions.

24. (Original) The carrier head of claim 22, wherein the flexible membrane includes a central portion with an outer surface providing the substrate receiving surface, a perimeter portion connecting the central portion to the base, and at least one flap extending from an inner surface of the central portion, the flap dividing a volume between the flexible membrane and the base into the plurality of chambers, the flap including a laterally extending first section and an angled second section extending beneath the first section and connecting the laterally extending first section to the central portion.

25. (Original) The carrier head of claim 24, wherein the second section has a horizontal loading area sized so as to react out a portion of the downward force on the first section that is created by a pressure in one of the plurality of chambers but is not reacted out by the base.

26. (Original) The carrier head of claim 25, wherein second section has a horizontal loading area about one-half that of the first section.

27. (Original) The carrier head of claim 25, wherein a point of attachment of the second section of the flap to the central portion is substantially vertically aligned with a midpoint of the first section between a point of attachment of the first section to the base and a point of attachment of the first section to the second section.

28. (Previously presented) A flexible membrane for use with a carrier head of a substrate chemical mechanical polishing apparatus, the membrane comprising:

a central portion with an outer surface providing a substrate receiving surface;

a perimeter portion for connecting the central portion to a base of the carrier head; and

at least one flap extending from an inner surface of the central portion, the flap including a laterally extending first section and an angled second extending beneath the first section,

wherein an upper surface of the laterally extending first section and a lower surface of the angled second section bound a same chamber of the plurality of chambers.

29. (Withdrawn) A method of polishing a substrate comprising:

mounting a substrate on a carrier head of a chemical mechanical polishing apparatus so that a first side the substrate is adjacent to the carrier head, the carrier head including a base portion, a retaining ring and a flexible membrane to provide a mounting surface for the substrate and define a plurality of chambers;

applying different pressures to the plurality of chambers to create regions of different pressure the substrate; and

polishing the substrate using a polishing pad contacting a second side of the substrate on a side opposite from the first side of the substrate;

wherein the flexible membrane is configured to provide a substantially uniform transition between different pressures in adjacent regions.

30. (Withdrawn) A method of operation of a flap of a flexible membrane, the flap connected between a carrier head and a central portion of the flexible membrane that provides a substrate receiving surface, the method comprising:

creating a pressure differential between chambers on different sides of the flap;

permitting a horizontal section of the flap to undergo vertical deflection; and

reacting out a vertical component of forces on the flap caused by the pressure differential.